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Federal -State Cooperative

Snow Surveys and Water Supply Forecasts

for

Montana and Northern Wyoming

Upper Missouri,
Upper Columbia and
Yellowstone Rivers





In cooperation with the U. S.Forest Service, U. S. Geological Survey, National Park Service, U.S. Bureau of Reclamation, State Engineers of Montana and Wyoming and other Federal, State and local organizations. May 1, 1954

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in that bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge River Forecast Center U. S. Weather Bureau 712 Federal Office Building Kansas City 6, Missouri

For current information on local river and flood conditions, reference should be made to the appropriate River District Office, listed below:

Meteorologist in Charge.......Missouri River and
Weather Bureau Office tributaries above
Box 1705 Fort Peck Dam; Milk
Helena, Mont. River

Meteorologist in Charge.......Yellowstone River
Weather Bureau Airport Station and tributaries.
Box 1338
Billings, Mont.

Meteorologist in Charge..............Columbia River and Weather Bureau Airport Station tributaries above R.F.D. #1 and including Grand Spokane, Washington Coulee Dam.

State of Montana

FEDERAL - STATE COOPERATIVE

SNOW SURVEYS and WATER SUPPLY FORECASTS

for
MONTANA AND NORTHERN WYOMING
(Upper Missouri and Upper Columbia River Basins)

Report Prepared by:

A. R. Codd
Hydraulic Engineer
Soil Conservation Service

and
O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

Soil Conservation Service
U. S. Department of Agriculture
and
Montana Agricultural Experiment Station
Bozeman, Montana

Report issued by:

Truman C. Anderson State Conservationist of Montana M. M. Kelso, Director Montana Agricultural Experiment Station



WATER SUPPLY OUTLOOK FOR THE SEASON 1954 AS OF MAY 1, 1954

The 1954 snow-pack over the Upper Missouri Basin * in Montana is very close to the average year flow. The Sun, Marias and Teton Rivers have an exception- * ally large snow-pack this season. Continued cold weather through April and additional snowfall has increased the flood potential on these three basins.* The snow-pack over the Yellowstone River Basins through Montana averages approximately 120% average * and should produce a good water supply through April and September. * In the Columbia River Basin in western Montana, the snow-pack on the Clarks Fork River is very close to * average while the snow covering the Flathead River Basin is considerably above average for May 1. The Kootenai River Basin north of the Flathead has * a record high snow-pack for this year. Flood po-* tential exists for all low water installations along this river. 头 *

JEFFERSON RIVER:

The Upper Missouri Basin tributary to the south on the Jefferson and Beaver-head Rivers is slightly below average, although it is anticiptated a FAIR WATER SUPPLY will result from melting snow. Beaverhead at Barratts is forecasting its flow 84 percent average or 171,000 acre feet. The Jefferson River at Sappington will flow approximately 80 percent average or 949,000 acre feet.

MADISON RIVER:

The snow covering on the Madison River has not changed a great deal during April due to colder weather and additional precipitation. This stream will flow approximately 96 percent normal, at West Yellowstone and comparable amounts down to Three Forks.

GALLATIN RIVER:

The 1954 snow-pack on the Gallatin River Basin is almost as large as last year and not quite as large as 1952. The water supply for the irrigation season is forecast to be 95% average for this year. The shut-off dates this season will be approximately same as last year, probably a few days earlier, depending upon May-June precipitation and the date of peak on the Gallatin. Cold weather will-retard the snow-melt and the peak may come later this Spring.



MISSOURI MAIN STEM:

The Main Stem of the Missouri from Toston to Fort Benton will carry slightly below average flow of water this irrigation season, about 92% average and very similar to last season.

The Sun, Teton and Marias Rivers will have exceptionally high flow this season. The snow pack on these basins is a record high. A FLOOD POTENTIAL exists at the present time. Cool weather has presented melting at high elevations. The longer the cool weather lasts, the worse the situation will be. The snow density is very high which also aggravates the situation by hastening the snow-melt process once the weather becomes warm.

UPPER YELLOWSTONE RIVER:

May I snow surveys conducted in and about Yellowstone Park indicate that this years water supply in the Yellowstone River above Livingston is going to be very similar to last year, or 107% average. Cold weather during the month of April has prolonged the snow-melt season and will probably produce higher peak flows than occurred last year, as soon as the weather becomes warmer.

COLUMBIA RIVER BASIN:

Snow measurements made at several courses on the Clarks Fork Basin on or about May 1 indicate an excellent water supply for this season. Most of the snow measurements were higher than last year, but valley precipitation has been very close to average during April. It is anticipated that there will be sufficient water for irrigation during the summer months. The Bitterroot valley will probably experience a lower flow than occurred last year. At Nezperce Pass, the snow water content this season was 9.7 inches as compared with 16 inches last season and an average for 17 years of 10 inches. Other snow courses measured in this basin have relatively the same comparison. The snow-pack on the Bitterroot Mountains to the south and west of Missoula is exceptionally high, probably the greatest depth and water content ever measured on these courses in the past 17 years.

At Hoodoo Summit, south of Superior, the snow is 152 inches deep containing 76 inches of water, as measured by the forest service. The average water content for this snow survey course is 36 inches. Although the drainage area into the Clarks Fork is small, the stream entering the river along this range will have an exceptionally high runoff during the snow-melt season.

FLATHEAD BASIN:

The snow on the higher tributaries on the Flathead Basin have an exceptionally high snow-pack this season, approximately 40% higher than last year and 130% average. The snow-pack on Desert Mountain above Coram is 45 inches deep containing 18 inches of water. Last year, the water content was 13 inches and the 17-year average was 10 inches.

In the neighborhood of Big Mountain, the snow is 88 inches deep with 36 inches of water. Last year, this same spot showed 30 inches of water and the 12-year average is 27 inches. Other snow courses in the high mountains have roughly the same comparisons. The North Fork of the Flathead is forecast to flow 118% of average during the period April through September. The Middle Fork is expected to flow 140% of average during the same period and the South Fork 132% or 2,980,000 acre feet from April through September. These figures



are approximately 25 percent higher than last year.

KOOTENAI BASIN:

The Kootenai River Basin has the largest snow-pack ever recorded during the past 17 years. The contributing areas from the Kootenai in Canada are also exceptionally high and April precipitation has been above average. A definite flood hazard exists on this river basin for the Spring run-off period. All low water installations and river island livestock should be moved to prepare for high water during the month of June and July. Cold weather over the entire basin has kept the snow from melting; as soon as warm weather begins, the river will probably rise very rapidly to dangerous heights.



U, S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

	EX	TO			TAN	ATT	& NC)RTHE	RN WYC	IM(NG		OV	v C	.00	RSES	
Painage Basin	Montane Number	OURI	Sec. Lat.	Two.	Range Long.	Record Began GE	Heasuring Dates ^a	Feasured By:	Prainage Pasin and Course Name	Montani Number	Elev.	Sec. Lat.	PP.	Hange Long,	Record Began		Heasu By:
(RCCK-BEAVERHEAD)									8IG HOPN RIVER Wy				,	,,,,,,,	0011		
Lakeview Ridge Lakeview Canyon Limekilin White Pine Ridge (HORSE PRAIRIE)	125 125 115 115 115 115	7400 6930 6950 8850	27 26 5 18	14S 14S 15S 14S	24 24 94 94	1948 1948 1948 1948	3,4,5 3,4,5 3,4 3,4	9 9 1 1	Seavers Mill Oul Creek Tensleep R.S. Timber Creek Eanger Creek Wood River	9F8 8F1 7-3 952 751 9F7	8900 8700 8300 8800 8800 8000	6 36 30 25 32 28	43N 43N 49N 47N 53N 46N	102W 101W 86W 103W 88W 103W	1948 1948 1935 1948 1935 1939	2,3,4,5 2,3,4,5 4,5 4,5 4,5 2,3,4,5	12 12 1 12 1 12
Bloody Dick Gold Stone Lemhi Pace Terrell Creek Trail Creek Selway Junction	13D10 13D9 13E1 13D12 13E2 13D11	7600 8100 7480 6650 7090 6800	12 11 9 14 15 27	8S 8S 10S 9S 10S 8S	16W 16W 15W 15W 15W	1948 1948 1948 1948 1948	3,4 3,4 3,4 3,4 3,4 3,4	1 1 1 1 1 1	(SHOSHONE RIVER) W Sast Entrance Sylvan Paes TONGUE RIVER Wyos	10E6 10E5	7000 7100	17 12	52N 52N	109W 11:0W	1948 1936	1,2,3,4,5	5
(BIG HOLE) Big Hole Pass Big Hole Pass (Below East Boundary Gibbons Pass Jahnke Creek	13D3 *)13D4 13D5 13D2 13D6	7440 6900 6700 7100 7340	28 24 22 4 25	3S 3S 3S 2S 7S	18W 18W 17W 19W	1948 1948 1948 1934 1948	3,4 3,4 3,4 1,2,3,4,5 3,4	1 1 1 1,2	Sig Goose Burgess Ranger Sta Nome Lake Lodgepole POWDER RIVER	7E2 7E4 7E5 9EL	7700 7900 8800 8200	36 11 32	53N 56N 53N 56N	86W 89W 87W 106W	1915 1950 1950 1940	2,3,4,5 2,3,4,5 2,3,4,5 4,5	1 12 12 1
Miner Forks Miner Lake (WISE RIVER)	13D6 13D7	7300 6720	10	6S 6S	17# 16W	1948 1945	3,4 3,4,5	î	North Powder Muddy Pass Soldier Park Sour Dough Red Fork	758 767 736 671 751	8500 9700 8700 8500 7000	5 11 36 17 18	47N 48N 51N 49N 43N	85W 85W 85W 84W 85W	1951 1950 1950 1936 1936	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	12 1 12 1 1
Anderson Mdw. Elk Horn Wise River (<u>RUBY RIVER</u>)	13015 13015 13013	7000 8450 6300	18 15 15	3S 4S 2S	12W 12W 12W	1948 1934 1948	3,4 3,4,5 3,4	1 2 1									
Cottonwood Cottonwood (Upper) Flashlight Fobacco Root Figilante	11E2 11E1 12D3 12D2 11D1	5900 8400 6950 6900 6125	24 30 22 13 28	105 105 85 45 95	3W 2W 7W 4W 3W	1948 1948 1945 1948 1948	3,4 3,4 3,4,5 3,4	1 1 1 1	KOOTEMAI RIVER		COLUI	MBIA	RIV	ER BA	ASIN		
MADISON RIVER Hebgen West Yellowstone	1185 1187	6550 6700	22	11S 13S	3E 5E	1934 1934	1,2,3,4,5	2 2	Baree Mountain Blue Bird Basin Red Mountain FLATHSAD RIVER	1581 14A1 15A1	6000 6800 6000	1 24 4	25N 37N 36N	31₩ 26₩ 29₩	1937 1937 1937	4,5 4,5 3,4,5	1 1 1
Norris Basin GALLATIN RIVER	1052	7500	thethe		1100-421	1935	3,4	5,6	Basin Creek Big Creek	13814 1383	5000 6750	11 6&7	19N 22N	12W 18W	1951 1941	2,3,4,5	1
Devil's Slide Hood Meadow Kystic Lake New World 21-Mile	10D4 10D3 10D2 10D1 11E6	81.00 6600 6600 6700 71.50	14 22 30 24 1	58 48 38 38 118	6E 6E 7E 6E 5E	1935 1934 1935 1939 1934	2,3,4,5 2,3,4 1,2,3,4,5 1,2,3,4,5	2,6 2,6 6,7 6,7	Brush Creek Cattle Quesn Desert Mouhtain HellRoaring Divide Holbrook Kishemehn	14A4 13A1 13A2 14A3 13B13	5000 4700 5600 5770 4530 4300	13 7 24 35 18 7	30N 35N 31N 32N 21N 37N	26W 17W 19W 22W 13W 21W	1937 1939 1937 1942 1951 1946	3,4,5 3,4,5 1,2,3,4,5 3,4,5 1,2,3,4,5 4,5	1 5 1 1 5
CISSOURI RIVER MAIN		(200		an		202/	30315	2	Limestone Pass Logan Creek Marias Pass	13B8 14A5 13A5	7000 4300 5250	28 34 34	18N 30N 30N	1.2W 24W 14W	1948 1937 1934	3,4,5 3,4,5 1,2,3,4,5	1 2
Chesaman Reservoir Crystal Lake Srasshopper Kings Hill Plenic Grounds Plpestone Pass Stemple Pass Fen Mile Creek, Low Fen Mile Creek, Undel Fen Mile Creek, Upen	tul203	6200 6100 7000 7950 6500 7200 6900 6250 6800 8000	2 24 19 35 22 11 16 13 13	8N 12N 9N 13N 5N 1N 13N 8N 8N 8N	5W 17E 8E 7E 6W 7W 7W 6W 6W	1936 1941 1938 1937 1940 1938 1934 1935 1934	1,2,3,4,5 3,4 3,4,5 2,3,4,5 2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5	2 1 2 3 1 2 2 2 2 2 2 2	Snow Lab. #16 Spotted Sear Mt. Strawborry Lake Trinkus Lake Trout Lake #2 Upper Holland Lake Twin Creeks Quintonkon Coyote Hill	13A9 13B2 13A10 13B1 13A12	5200 7000 6500 6500 3600 7000 3580 3800 1200	15 23 11 9 21 28 14 11	29N 25N 28N 25N 28N 20N 26N 26N	14W 15W 19W 17W 17W 16W 16W 16W	1946 1948 1948 1948 1948 1948 1951 1951	1,2,3,4,5 3,4,5 3,4,5 3,4,5 3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	2 1 1 1 1 1 1 1 1 1 1 1
TETON PIVER)							, , , , , ,		El Dorado Mine Gold Creek Lake Intergeard	1309 1308 130L	7800 7200 6L50	23 14 6	8N 8N 5N	12W 12W 13W	1946 1946 1939	4 4 2,3,4	11 11 3
reight Craek aldron Creek est Fork SUN RIVER)	12A1 12B2 12B1	6000 5600 6000	13 16 6	26N 25N 25N	10W 9W 9W	1948 1948 1948	3,4 3,4 3,4	1 1	Lubrecht Forest North Fork Jooko Pionio Grounde Pipestone Pase Rainy Lake	1308 1387 1206 1201 1386	51,00 6330 6500 7200 1300	31 3 22 11 11	1LN 17N 5N 1N 18N	15त 17त 6त 7त 16त	1951 1941 1940 1938 1947	1,2,3,4,5 3,4,5 2,3,4 2,3,4,5 3,4,5	13 4 3 1
Sench Mark Cabin Creek 5-Bull Sates Park Goat Mountain ty Lake Vrong Creek Ridge	12B8 12B6 12B9 12B5 1287 13B9 12B3	5500 5400 5600 5300 7000 7300 6800	9 33 36 31 20 21	20N 23N 20N 24N 22N 23N 25N	10W 10W 10W 10W 10W 10W	1948 1949 1948 1949 1934 1950 1949	3,4 3,4 3,4 3,4 3,4 3,4 3,4	1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Slide Rock Mountai Southern Crose Stemple Pass Storm Lake No. 2 Stuert Mill Stuert Mountain #1	1305 1301 1307 1306	7100 6500 6900 7780 6500 7100	26 9 16 19 19 6	10N 5N 13N 4N 5N 14N	16m 13m 7m 13m 13m 13m	1937 1939 1934 1939 1939 1936	2,3,4 2,3,4 2,3,4 2,3,4	1 3 2 1 3 1
(MARIAS RIVER) Marias Pass	1345	5700 5250	32	25N 30N	14W	1949	1,2,3,4,5	2	PEND OREILLE RIVER Baree Fountein Freezeout Submit & Hoodoo Creek	1381 2 15810 1501	6000 6800 6200	1 21 9&16	25 N 15 N 1 L/N	31W 27W 27W	1937 1951 1937	4.5 4	1 1 1
MILK RIVER)	911	5200	15	28N	168	1941	3,4	7	81TTERROOT RIVER East Fork Renger Str Gibbons Pees Mud Creek Pasture	13D1 13D2 1LC1	51,00 7100 1,500	16	2N 2S 11N	17W 19W 2LW	1937 1934 1937	կ 1,2,3,և,5 3	1 1
MUSSELSHELL RIVOR) Tasshopper PPOR YELLOWSTONE)	1003	7000	19	9N	8E	1938	3,4	1	Ner Perce Camp Nerperce Pase Skelkaho Summit	1401 1401 1303	5580 6575 7259	19420 32 30	1S 28N 6N	23m 16E 17m	1937 1937 1937	† †	1 1 1
Camp Senia Canyon Cooke City Crevice Ft. Independence Lake Camp Lupine Creek	9D1 10E3 10D7 10D5 10D6 10E4 10E1	7890 7750 7400 8400 8000 7850 7300	25 25 29 22 44°-34° 44°-54°	95 93 79	18E 110°-30' 14E 9E 12E 10°-24' 10°-37'	1937 1938 1937 1935 1941 1937 1938	1,2,3,4,5 1,2,3,4,5 3,4 3,4 1,2,3,4,5 1,2,3,4,5	1 12 5 1 12 12 5	ST. MARY RIVER	SASKA	ATCHE	WAN	RIVI	ER BA	SIN		
(SHIFLDS RIVER) Porcupine LOWER TELLOWSTONE	1003	6500	10	4N	108	1938	3,4	1	Ioaberg Laka Piegan Pasa #4 Piagan Pass #0 Mount Allan #7	13A3 13A4 13A6 13A7	5000 L	180-1714 180-124 180-204	1	13°-12' 13°-10' 13°-12'	1922 1922 1922 1922	5 5 5	2,8 2,8 2,8
(Wind River) Myomin Brooks Lake #3 Burroughe Creek Dimocodke Dry Creek DuNoir Geyser Creek Hobbs Park Histla Marm Mosquito Park R.S. Sheridan R.S. Sheridan R.S. St. Lewrence R.S. Forence Park Topyother Pass (Pope Agte Hiver) #8 Blue Ridge Drannier Peadewe Larsen Creek	E 10P2 9P6 9F10 9F9 9P2 9P3 9C2 9F4 9F11 9F11 9F5 9G1 10F1 4yoming 8C2 8C4 9G4	9200 8800 10000 9500 8750 8500 10000 9500 9500 9500 9000 8000 8400 9600	15 934 27 12 22 24 23 3 26 1 5 29 23	43N 39N 44N 42N 41N 28 41N 28 42N 11N 43N 28 44N 31N 330N 330N	110W 107W 105W 6W 108W 3W 108W 109W 4W 107W 2W 110W 107W 20 110W 100W 100W 100W 100W 100W 100W	1939 1948 1948 1948 1948 1948 1948 1948 194	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	12 12 12 12 12 12 12 12 12 12 12 12 12 1	a. Numerals 1,2,3, b. Numerals refer 1. U. 2. U. 5. M.	13A8 Li, and 5 to Agano S. Force S. Geolo Ontana Po S. India Attional P Montana Ex tty of 8 S. Fich S. Fich S. Suras	refer to y that ac tt Services gieal Sur wer Compe n Service rark Servi periment temen later and and Wildlu of Reol	January ource the vey and my oa Station Power Brifa Service	U.S. E	brany 1	1922 March I	5 , April 1, a	2,8

MAY 1, 1954 FORECAST OF SEASONAL STREAM FLOW

	Seasonal Stream				
UPPER MISSOURI RIVER	FORECAST 1954	1 /	Measured		10-Yr.
IN MONTANA	April		April -		Avg.
****	Sept.	Avg.	1953	1952	1942-51
RED ROCK RIVER					
Monida (near) (1)	85	97		69	87
Kennedy Ranch (at)					
BEAVERHEAD RIVER				000	000
Barratts, Montana	171	84		222	203
BIGHOLE RIVER	(50	00		808	821
Melrose (near)	659	80		000	021
JEFFERSON RIVER Sappington (at)	949	80		1135	1185
MADISON RIVER	949	00		11))	1107
West Yellowstone (near)	200	96		248	208
Garyling (near) (2)	423	94		563	445
McAllister (near) (3)	746	99		963	756
GALLATIN RIVER	, , , ,	//			
Gateway (near)	կկկ	95	404	596	465
Logan (at)	469	92	442	745	506
MISSOURI RIVER					
Toston (at)	2150	86	2026	2825	2427
Fort Benton (at) (5)	3530	94		3882	3767
Loma (5)	4360	96		4562	4542
Zortman	4760	97		5115	4920
Ft. Peck Dam (below) (5)	4550	94		5188	4852
SUN RIVER					1
Vaughn (near) (4)	563	125	692	312	451
MARIAS RIVER			0.21	1.76	600
Shelby (near)	672	124	934	476	628
Brinkman (near)	684	109	1025	533	629
JUDITH RIVER			38	48	46
Utica (near) YELLOWSTONE RIVER	51	110	30	40	40
Corwin Springs (at)	701.0	00	1660	2171	1957
Livingston (near)	1940	99	1000	2408	2267
	2124	94		4642	4344
Billings (at)	3883	89		6265	7024
Miles City (at) Sidney (near)	6399 6600	91 91		6857	7266
SHIELDS RIVER	0000	71		1 0051	1200
Wilsall (near)	45	100		50	45
Clyde Park (at)	102	87		162	118
CLARK FORK RIVER	105			102	120
Chance (at)	540	87		576	617
Edgar (at)	551	83		613	657
Hyalite Creek (Ranger Statio	n) 34	91	33	41	37
(at) (6)	,	7-		1	

(1) Observed flow plus change in storage in Lima Reservoir

(2) Observed flow plus change in storage in Hebgen Lake(3) Observed flow plus change in storage in Hebgen and Ennis Lakes

(4) Observed flow plus change in storage in Gibson, Willow Crk and Pishkun Res.

(5) Observed flow plus change in Storage in Canyon Ferry and Ft. Peck Reservoirs

(6) Observed flow plus change in storage in Hyalite Reservoir

* Preliminary data furnished by U. S. Geological Survey subject to revision



MAY 1, 1954 FORECAST OF SEASONAL STREAM FLOW

MISSOURI RIVER BASIN	Seasonal Stream	Flow i	n Thousan	ds of acr	re feet
YELLOWSTONE RIVER TRIBUTARIES	FORECAST 1954	1 %	Measured		10-Yr.
in Wyoming	April	10-Yr.	April -		Avg.
	Sept.	Avg.	1953	1952	1942-51
WIND RIVER					
Riverton (at) (6)	550	100		354	556
BIG HORN RIVER					
Thermopolis (at) (7)	940	90		374	1046
Kane (at)	1341	90		767	1490
St. Xavier (near) (8)	2110	93		1286	2269
BULL LAKE CREEK					
Bull Lake (above)	192	95	ļ	214	202
Lenor (near)	145	100			145
POPO AGIE RIVER					
Riverton (near)	402	105		450	383
NORTH FORK POPO AGIE RIVER					
Lander (near) (9)	78	102	4	92	77
LITTLE POPO AGIE RIVER					
Hudson (at)	63	110		81	57
GREYBULL RIVER			1		
Meeteetse (at)	218	92	Polymer	279	237
Basin (near)	104	92		173	113
SHOSHONE RIVER					
Buffalo Bill Dam (below)(10)	854	106		697	806
Byron (at) (10)	677	108		486	627
TONGUE RIVER				400	VEI
Dayton (near)	105	90		104	117
Acme (near)	247	90	The state of the s	239	274
Decker (near) Mont.(11)	253	90	and the state of t	249	281
POWDER RIVER					
Arvado (at)	145	102	n production of the control of the c	125	142
Moorehead (at) Montana	240	85	emerge age	235	283
Locate (at) Montana	275	78		303	352
MIDDLE FORK POWDER RIVER		10		707	
Kaycee (near)	65	91		36	72
NORTH FORK POWDER RIVER		/ =			-
Mayoworth (near)	17	91		17	19
CLEAR CREEK	enterminativi gyprindenski ministrativi principali principa i a na saka ministra principali demokrativa a a a a principali		NATION AND ADDRESS AND AN EAST OF TAXABLE PROPERTY AND ADDRESS AND	+	
Buffalo (near)	40	103		35	39
Arvado (near)	130	103		100	126
	٠,٠	200	1	100	120

⁽⁶⁾ Observed flow plus storage in Bull Lake and Pilot Butte Reservoirs

(7) Observed flow plus storage in Boysen Reservoir

(11) Observed flow plus storage in Tongue Reservoir

Forecasts prepared by George W. Peak, SCS, Casper, Wyoming

⁽⁸⁾ Observed flow plus storage in Boysen and Buffalo Bill Reservoirs

⁽⁹⁾ Observed flow plus storage in Bull Lake Reservoir (10) Observed flow plus storage in Buffalo Bill Reservoir

^(*) Preliminary data furnished by U. S. Geological Survey subject to revision



MAY 1, 1954 FORECAST OF SEASONAL STREAM FLOW

	Seasonal Stream				
UPPER COLUMBIA RIVER	FORECAST 1954	%	Measured		10-Yr.
IN MONTANA	April	10-Yr	April - 1953	1952	Avg. 1942-51
	Sept.	Avg.	1953	1992	1742-71
CLARK FORK RIVER					
Bonner (above) (3)	801	94	808	833	855
Missoula (above)	1904	105	1887	1782	1809
Missoula (below)	3546	106		3268	3334
St. Regis (at)	4752	107		4318	4430
Plains (near) (4)	14272	119	11882	11551	11950
Cabinet Gorge (at) (4)	16122	121		13000	13370
Z-Canyon (below) (8)	17873	116	15706	15501	16673
BLACKFOOT RIVER				-10	-14
Bonner (near)	1103	117	1078	948	946
BITTERROOT RIVER	(20	- 00		(00	۲00
Darby (near) At Mouth (6)	632	108	557	608	582
Ac modeli (O)	1642	107		1486	1525
FLATHEAD RIVER					
Columbia Falls (near) No. I	7k. 2199	118	1949	1745	1851
Columbia Falls (at) (7)	7810	129	6522	5733	6040
Polson (near) (4)	9166	130	7565	7034	7051
					1-7-
MIDDLEFORK FLATHEAD RIVER	01.00				
West Glacier (near)	2499	140	2066	1632	1791
SOUTH FORK FLATHEAD RIVER	2980	132	0000	00/5	0015
Columbia Falls (near) (7)	2,00	1)2	2277	2067	2247
PRIEST RIVER					
Priest River (near)	1044	114		880	915
SWAN RIVER					
Big Fork (at)	770	129			595

(3) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner (4) Observed flow plus change in storage in Flathead Lake & Hungry Horse Reservoir

(6) Difference in observed flow, Clark Fork above and below Missoula (7) Observed flow plus change in storage in Hungry Horse Reservoir

(8) Observed flow plus change in storge in Hungry Horse, Flathead & Pend Oreille Lk

(*) Preliminary data furnished by U. S. Geological Survey, subject to revision



BASIN		USEABLE	THO	HISAND ACE	RE FEET I	M ምርም ል	er.
& .		CAPACITY		PRIL 30	te PEEL I.	N DIOIM	10-yr avg
STREAM	RESERVOIR	(M.A.F.)	1954	1953	1952	1951	1942-51
MISSOURI RIVER	BASIN	·					
Beaverhead Ruby River	Lima Ruby	84.00	28.3	48.3	62.4	72.0	66.6
Madison Riv	Hebgen Lk	345.00	196.7	203.3	205.2	261.3	229.4
Madison Riv	Ennis Lk	41.00	34.1	33.4	38.4	29.9	34.0
Hyalite Crk	Missle Crk	8.03	4.8	5.5			
Missouri Riv	Canyon Ferry	401.70	437.0	80.5	26.4	20.5	26.5
Missouri Riv	Hauser Lk		100				
	(Inc. Lk Helena		48.3	51.9	34.6	52.9	रिंगि ।
Missouri Riv	Lk Helena	10.45	5.8	6.9	2.2	7.2	~
Missouri Riv	Holter Lk	81.92	79.6	36.6	57.8	56.5	57.7
N.Fk.Sun Riv	Gibson	105.00	54.9	73.9	92.6	81.7	73.3
N.Fk.Sun Riv N.Fk.Sun Riv	Willow Crk Pishkun	32.30	25.7	28.2	26.8	27.1	15.9
Teton Riv		32.00	2401	19.9	23.5	19.0	20.8
Birch Crk	Bynum Swift	30.00	18.6	22.0	30.2	20.0	07.0
Birch Crk	Lk Francis	30.00 112.00	92.6	101.4	98.8	30.2	27.2 96.3
Judith Riv	Ackley Lk	5.82	12.0	101.4	90.0	102.2	90.5
Missouri Riv			12,140.0	12,630.	13,630	3 1,00	11,469.
Milk Riv	Fresno	127.20	128.4	97.5	148.5	132.5	87.7
Milk Riv	Nelson	66.80	44.0	36.7	40.3	18.5	30.2
W.Rosebud Crk	Mystic Lk	20.80	4.0	4.8	2.9	1.2	3.4
Red Lodge Crk	Cooney	27.50	17.1	19.6	18.3	16.5	13.6
Tongue Riv	Tongue Riv	73.90		22.1	30.1	15.0	17.9
Swiftcurrent C	r Sherburne Lk	66.10		25.4	28.5	39.9	26.9
xx 9 year aver							
MISSOURI RIVER	BASIN - WYOMIN	G					
Shoshone Riv	Buffalo Bill	140.00	156.4	164.7	233.7	236.2	291.0
Wind Riv	Boysen	758.00	360.3	455.4	233.4		
Wind Riv	Pilot Butte	31.6	62.3	29.4	19.1	21.0	20.8
Bull Creek	Bull Lk	152.00	8.4	51.0	33.9	71.5	54.9
Belle Fourche	Key Hole	190.00	0.4				
MISSOURI RIVER	BASIN - NORTH	DAKOTA					
Hart River	Hart Butte	54.80	76.8	57.7		400 Mg	
Hart River	Dickerson	4.3	5.9	3.6			
MISSOURI RIVER	BASIN - SOUTH	DAKOTA					
Belle Fourche	Belle Fourche	185.00	36.4	76.6	143.4		147.4
Cheyenne River		160.00	34.3	46.2	33.6	465 MD	
Cheyenne River		15.1	15.1	14.7	15.1		14.0XX
Grand River	Shadehill	84.00	83.3	83.4	118.8		
xx 5 year ave	erage		,	1			



STATUS OF RESERVOIR STORAGE APRIL 30, 1954

BASIN		USEABLE	THO	USAND AC	RE FEET	IN STORA	G E
&c		CAPACITY	Al	PRIL 30			10-yr avg
STREAM	RESERVOIR	(M.A.F.)	1954	1953	1952	1951	1942-51
COLUMBIA DIVER	DACTN						
COLUMBIA RIVER	DASIN						
Flint Crk	Georgetown Lk	31.00	21.5	23.8	21.6	21.4	21.7
Rock Crk	Como Lk	34.80		8.6	20.7	16.6	19.0
S.Fk.Flathead	Hungry Horse	3,500.00	1,634.0	898.4	102.8		
Flathead Riv	Flathead Lk	1,791.00	910.0	777•9	1212.0	990.6	965.8
Little	Little						
Bitterroot*	Bitterroot	36.10	28.9	31.6	36.1	36.1	18.4
Dry Fork Crk**	Dry Fork	6.70	5.0	5.6	6.4	5.8	4.7
Flathead Irr.							
Project***	Mission Valley	98.60	45.1	43.4	67.2	58.8	48.6
Jocko Crk	Lwr.Jock Lk	7.6	277	0.2	5.8	NR	
Clark Fork	Pend Oreille L	K	692.9	517.7	1024.0	811.0	756.0

Sum of two reservoirs on Little Bitterroot

NR

Sum of two reservoirs on Dry Fork Creek Sum of (8) eight reservoirs on Project No Record **

^{***}



			SNOW COVER MEASUREMENTS						
MISSOURI BASIN				1954	1	Pa	st Rec	ord	
DRAINAGE BASIN			Date	Snow		Water	Conter	nt (In.)	Years of
A ND SNOW COURSE	No.	Elev.	of Survey	(In.)	Content (In.)	1953	1952	Average	
							THE PROPERTY OF PERSONS	gride to constructing age 100 to gride transcribe 900	e territorio dell'interio anni etili
JEFFERSON RIVER									
(Rock-Beaverhead) Lakeview Ridge Lakeview Canyon	11E3 11E4	7400 6930				7.6	10.6 17.9	6.4 10.0	14 14
(Big Hole) Gibbons Pass Miner Lake *Moose Creek	13D2 13D7 13D16	7100 6720 6200	4/29	52	23.8	28.7	21.8	20.3	18 2 11
(Wise River) Elk Horn	13015		4/30	25	7.7	10,2	3.8	6.0	11
MADISON RIVER									
Hebgen W. Yellowstone 21-Mile Norris Basin	11E5 11E7 11E6 10E2	6550 6700 7150 7500	կ/28 կ/29 կ/29 կ/29	00 11 35 23	0.0 2.8 14.4 6.3	6.2 5.8 12.5	7.2 6.8 16.1 0.0	2.9 3.8 10.7	20 20 20 3
GALLATIN RIVER									
Devil's Slide Hood Meadow 21—Mile	10D4 10D3 11E6	8100 6600 7150	5/2 5/2 4/29	57 11 35	20.1 2.8 14.4	23.3 5.2 12.5	25.6 2.5 16.1	21.5 4.2 10.7	19 19 20
MISSOURI RIVER MAI	N STEM								
Chessman Res. Kings Hill Pipestone Pass Stemple Pass Tenmile, Lower Tenmile, Middle Tenmile, Upper	1205 1001 12D1 12C1 12C2 12C3 12C4	6200 7950 7200 6900 6250 6800 8000	4/30 4/26 5/3 4/30 5/2 5/2 5/2	8 40 13 40 19 35 42	1.2 14.6 1.3 13.4 3.5 10.1 14.9	3.5 12.4 6.1 8.8 5.4 11.8 16.2	0.0 9.8 0.3 4.2 0.0 1.7 5.9	1.7 11.6 2.3 6.0 2.2 6.7 10.5	18 13 14 19 18 19
(Sun River) Goat Mountain	12B7	7000	5/4	52	19.2			3.6	7
(Marias River) Marias Pass	13A5	5250	6/29	91	33.0	17.4	10.5	10.3	19
UPPER YELLOWSTONE									
Canyon Cooke City Lake Camp Lodgepole, Wyo. Lupine *Lewis Lake Div.	10E3 10D7 10E4 9E1 10E1 10E9	7750 7400 7850 8200 7300 7000	5/1 5/1 4/30 4/30 4/30	15 24 33 25 107	5.2 8.1 11.8 9.5 49.0	13.9 5.4 6.5 11.3 9.0 41.2	13.3 3.2 7.9 6.9 0.0 山4.5	11.9 4.9 7.7 8.7 5.4	7 9 8 16 5 2

^{*} Adjacent Basin



					SNOW C	OVER ME	ASUREM	EMPS	
MISSOURI BASIN				1954	DNO# O	Pa	st Rec	ord	1.
DRAINAGE BASIN			Date	Snow	Water		Conten	t (In.)	Years
AND SNOW COURSE	No.	Elev.	of Survey		Content (In.)	1953	1952	Average	of
			Burvey	(2110)	(1110)	1///	1//2	Average	necor d
LOWER YELLOWSTONE above Divers									
Brooks Lake #3 Burroughs Creek Du Noir Geyser Creek Little Warm Sheridan T-Cross Ranch *Togwotee Pass	10F2 9F6 9F2 9F3 9F4 9F1 9F5	9200 8800 8750 8500 9500 7500 8000 9600	4/26 4/27 4/25 4/26 4/26 4/26 4/27 4/30	75 42 24 20 63 11 17 80	32.3 16.7 8.3 6.5 23.3 4.6 5.8 37.0	28.6 17.0 6.3 5.8 19.0 5.8 5.5 31.7	29.1 10.4 2.5 2.3 17.8 0.0 5.3 30.8	25.5 16.3 6.8 5.2 21.7 2.2 3.0 37.0	18 5 12 5 13 12 5
Dinwoodie Dry Creek Hobbs Park Mosquito Park St. Lawrence Trout Creek	9F10 9F9 9G2 9G3 9F11 9G1	10000 9500 10000 9500 9000 8400	4/25 4/25 4/29 4/29 4/30 4/29	49 28 55 20 16 0	16.9 8.6 22.6 7.4 5.4 0	14.9 9.4 11.9 7.7 5.1 4.7	14.5 5.9 26.8 12.9 9.3 8.5	15.2 8.3 23.2 7.1 7.6 2.9	55580 105
LOWER YELLOWSTONE POPO AGIE RIVER									
Blue Ridge Grannier Meadows Sawmill Glade South Pass	8G2 8G4 8G1 8G3	9500 9000 8500 9000	5/1 5/1 5/1 5/1	46 47 20 50	12.3 16.0 2.0 16.8	9.3 9.7 5.6 10.2	20.5 20.1 11.6 20.7	12.4 13.7 7.1 14.5	14 17 14 14
BIG HORN RIVER - W	YOMING								
Beavers Mill Owl Creek	9F8 8F1	8900 8700	4/26 4/27	24 22	8.7 7.6	14.3	5.7 6.9	7.9 7.7	5 5
Timber Creek Wood River	9E2 9E7	8800 8000	4/30 5/1	13 14	8.1 3.2	 3.5	 1.1	5.8 4.2	3 13
Tensleep R. S. Ranger Creek	7E3 7E1	8200 8800	5/3 4/30	13 22	3.6 5.9	5.8 7.3	3.8 5.2	4.5 6.4	18 17
SHOSHONE RIVER									
East Entrance Sylvan Pass	10E6 10E5	7000 7100				_	0.0		2 15
TONGUE RIVER									
Burgess Jct. Big Goose Dome Lake * Adjacent Basin	7 E l 7 E 2 7 E 5	7900 7700 9000	5/2 5/3 5/2	52 4 28	20.8 1.1 8.9	14.5 5.9 11.2	9.2 0.0 5.0	13.8 2.8 6.9	4 17 5



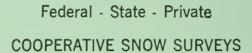
		SNOW COVER MEASUREMENTS							
MISSOURI & COLU DRAINAGE BASINS			Date	1954 Snow			Senten	ord t (In.)	Years
COUR	SES		of	Depth	Content			<u> </u>	of
	No.	Elev.	Survey	(In.)	(In.)	1953	1952	Average	Record
MISSOURI BASIN POWDER RIVER									
Sour Dough North Powder Soldier Park Muddy Pass	6E1 7E8 7E6 7E7	8500 8500 8700 9700	4/29 5/3 5/3 4/29	27 12 13 31	5.5 2.0 3.6 7.8	6.7 3.0 3.8 10.0	2.2 5.2 3.2 7.1	5.1 4.1 4.4 8.5	17 2 3 4
COLUMBIA BASIN KOOTENAI RIVER	(above L Monta								
Baree Mt. Brush Creek Fernie New Fernie Ferguson Kimberley Marble Canyon Red Mt., Mont. Sinclair Pass Smith Creek Sullivan Mine Gray Creek Sandon Blue Bird Glacier	13B1 14A4 Can. Can. Can. Can. 15A1 Can. 16A1 Can. Can. Can. Can.	6000 5000 3500 4100 3000 3800 5000 6000 4500 4800 5100 5100 6800 4100	4/29 4/29 5/1 5/1 5/1 5/1 4/27 4/29 5/1 4/29 5/1 5/2	137 48 36 55 62 20 61 73 29 130 51 72 35 129 96	57.2 18.6 13.9 21.3 29.8 8.0 21.8 30.0 8.4 61.8 19.2 24.8 15.7 59.4 41.7	42.2 10.3 3.8 5.1 13.6 14.2 20.9 1.7 50.3 10.2 17.7 45.5 30.5	37.6 2.3 0.0 0.0 12.3 7.5 9.4 0.0 32.6 9.2 15.5 0.0 34.9 18.1	40.0 6.3 2.5 14.8 13.4 15.5 1.3 35.7 10.8 19.3 20.1 36.7 25.9	17 10 7 2 6 6 16 7 15 6 6 6 15 8
Blue Bird Basin Creek Big Creek Brush Creek Coyote Hill Desert Mount. Hell Roaring Holbrook Logan Creek Marias Pass N.Frk Jocko Quintonkon * Observation	14A1 13B14 13B3 14A4 13B11 13A2 14A3 14B13 14A5 13A5 13B7 13A13	6800 5000 6750 5000 4200 5600 5700 4530 4300 5250 6330 3800	5/3 5/1 4/30 4/29 5/1 5/3 4/30 5/1 4/29 4/29 4/28 5/1	129 18 * 120 48 14 45 88 12 * 21 91 112 30	59.4 * 6.3 * 49.0 18.6 5.6 17.8 35.7 4.6 * 7.2 33.0 50.3 11.9	45.5 0.0 45.9 10.3 3.7 13.3 30.2 0.0 1.6 17.4 42.9 3.5	34.9 0.0 42.1 2.3 0.0 7.9 25.3 0.0 0.0 10.5 35.1 4.1	36.7 1.7 43.6 6.3 10.2 27.0 1.5 1.1 10.3 36.8 4.7	15 4 5 10 7 17 12 4 15 19 6 3



					SNOW CO	OVER ME	ASUREMI	ENTS	
				1954			st Rec		
COLUMBIA BASIN DRAINAGE BASIN			Date of	Snow	Water Content	Water	Conten	t (In.)	Years of
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	1953	1952	Average	
FLATHEAD RIVER (C	Cont'd)								
Spotted Bear Strawberry Lake Trinkus Lake Trout Lake Twin Creeks Upper Holland	13B2 e 13B10 13B1 13A12 13B11 13B5	7000 6500 6500 3600 3580 7000	4/29 5/3 5/3 4/28 4/28 5/4	53 99 117 39 12 106	17.6 45.7 52.0 14.9 4.4 46.2	6.9 40.5 37.9 34.1	39.7. 40.6 4.3 0.0 34.0	10.6 40.5 40.2 9.0 33.9	3 5 5533
UPPER CLARK FORK									
Coyote Hill Chessman Res. Lubrecht Forest North Frk Jocko Pipestone Pass Slide Rock Mt Stemple Pass Storm Lake #2 Stuart Mt. #1 *Tenmile, Lower *Tenmile, Middle *Tenmile, Upper 19 Meadows *Lookout	13B7 12D1 13C2 13C1 12C7 13C1 12C2	4200 5200 5400 6330 7200 7100 6900 7780 7400 6250 6800 8000 5000 5250	5/1 4/30 5/1 4/28 5/3 5/6 4/30 5/3 5/2 5/2 5/2 5/2 4/30	14 8 No Sr 112 13 44 40 38 44 19 35 42 92 105	5.6 1.2 now 50.3 18.7 13.4 13.6 18.7 3.5 10.1 14.9 14.3 47.2	3.7 3.5 0.0 42.9 6.1 8.8 5.4 11.8 16.2 29.8	0.0 0.0 0.0 35.1 0.3 13.5 4.2 31.1 0.0 1.7 5.9	1.7 36.8 2.3 10.5 6.0 13.6 26.2 2.2 6.7 10.5 26.9 23.0	7 18 3 6 14 12 19 12 14 18 19 18 13
BITTERROOT									Charles and the control of the contr
Gibbons Pass Nezperce Pass Nezperce Camp Stuart Mt.#1 *Packers Meadow	13D2 14D1 14D2 14C2	7100 6575 5580 5700	4/29 5/3 5/3 4/29	52 27 10	23.8 9.7 4.1 32.3	28.7 16.1 12.0	21.8 12.2 4.0 31.1 12.3	20.3 10.1 4.8 26.2 13.1	18 17 17 14 16
PEND ORIELLE									
Baree Mt. Freezeout Sum. Hoodoo Creek *Smith Creek Benton Springs	13B1 15C3 13C1 16A1 16A3	6000 7000 6200 4800 4900	4/29 4/30 4/29 4/30	137 133 130 55	57.2 56.6 61.8 24.8	Ц2.2 50.3 19.2	37.6 33.1 38.6 32.6 14.7	40.0 27.6 36.5 35.7 13.5	17 12 11 15 17
ST. MARY Iceberg Lake Peigan Pass #4 Peigan Pass #6 Mt. Allen #7 Ptarmigan #8	13A3 13A4 13A6 13A7 13A8	5750 5000 6250 7250 6000	5/6 5/4 5/4 5/4 5/6	116 98 146 169 137	46.2 37.8 65.8 72.1 51.7	32.7 18.6 41.0 50.4 46.4	10.3 6.4 23.9 31.9 25.6	21.4 11.4 31.6 39.8 30.7	32 32 32 32 32 17
*Adjacent basin									







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"